Assessing the Relevancy of National Culture in Predicting the Efficacy of Constraints in the Information Systems Consulting Domain

Completed Research Paper

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Abstract

Opportunism is present in professional services and, as a result, organizations adopt mechanisms to constrain it. Despite the work on constraining opportunistic consultants, researchers have generally ignored the potential impact of national culture on the efficacy of constraint mechanisms. Using the theory of relationship constraints (TRC), this study examines the effectiveness of different constraint mechanisms for information systems (IS) consultants in the United States and China based on different levels of information asymmetry, tacit and explicit knowledge. While we found support in both cultures for the salience of these dimensions, we also found important distinctions for the effectiveness of different constraints between the cultures. Legal constraints are more effective in China while social constraints are more effective in the United States. While TRC is relevant in both cultures, national culture moderates the effectiveness of various constraint mechanisms and highlights the need for additional study.

Keywords: Opportunism, theory of relationship constraints, national culture, knowledge type

Culture and Opportunism

Inter-organizational relationships are subject to opportunism, "self-seeking interest with guile" (Williamson 1985), which arises because the drive to acquire can overwhelm the drive to bond, two of the four fundamental drivers of human behavior (Lawrence 2007; Lawrence and Nohria 2002). Opportunism refers to an individual *intentionally* engaging in actions that they know are wrong (blatant) or refusing to share relevant information despite a belief that the sharing is required (passive) (Wathne and Heide 2000). Opportunism includes "lying, stealing, cheating and calculated efforts to mislead, distort, disguise, obfuscate or otherwise confuse" (Williamson 1985, p. 47), the failure to tell the full truth, the actions to conform to the letter but not the spirit of the law, and to deliberately induce contract breaches for selfish purposes (Williamson 1993). It subsumes the concepts of adverse selection and moral hazards (Williamson 1993). Opportunism occurs because humans are only "weakly moral" and will not always faithfully honor a contract. As a result, relying upon a legal agreement as an inviolable intention is fraught with hazards (Williamson 1993).

In all cases, opportunism is taking advantage of a trusting relationship to advance self-interest and it weakens or destroys social bonds. While the fans of markets often promote the advantages of naked self-interest, many businesses cannot operate in a purely market mode. They often need long-term mutually trusting relationships with other firms (e.g., multi-year consulting engagements) and thus expose themselves to opportunism. As a result, societies establish mechanisms (e.g., contract law and professional organizations) in an attempt to constrain opportunism.

Surprisingly, opportunism has rarely been studied cross-culturally (Chen et al. 2002), and there has been even less scholarship on the relative effectiveness of constraint mechanisms. Given the adverse consequences of opportunism and the multi-level connectivity and interdependence of the two major economies, the U.S. and China, and their divide on cultural dimensions (Hofstede 1980), this gap in knowledge is worthy of study. Because the cultural cleavage is a potential explainer of opportunistic propensity differences between cultures (Chen et al. 2002), it could also clarify differences in the effectiveness of opportunism constraint mechanisms. As far as we can ascertain, there has been no research examining this issue between any cultures. As opportunism is at the heart of transaction cost economics, one of the key theories of organizational research (Mastens 1993), an empirical investigation of the relative effectiveness of opportunism constraints in each culture can contribute to understanding how to mitigate opportunism in different settings.

Opportunism exists in professional services (Sharma 1997), and history is replete with examples of opportunistic consultants. Frederick Taylor, known as the founder of scientific management and arguably the "grandfather of management consulting," was known to fudge his data, lie to his clients, and greatly exaggerate the record of his own success (Stewart 2009). For example, Taylor argued that he could save railroads a million dollars a day through the use of greater efficiency but the number was "merest moonshine" and was nothing more than a simple ballpark guess based on unsupported and highly questionable assumptions (Leopore 2009). Many of Taylor's well-known efficiency claims, such as the famous Bethlehem Steel pig iron loading study, were later discovered to be based on fanciful and ill-supported assumptions but were foisted upon unsuspecting clients who lacked sufficient information to challenge his claims (Stewart 2009). Taylor's clients were easily persuaded to repeatedly invite him to consult for them since they desperately wanted his promised efficiency improvements. However, they lacked sufficient information to protect themselves against Taylor's ill-supported claims. In short, asymmetric information allowed Taylor to be opportunistic with his clients.

Opportunistic consultants also inhabit the field of IS consulting. For example, in 2007, a large technology firm, under a USD 1.7 billion contract with the U.S. federal government to install and monitor seven intrusion detection devices, reported that all seven had been installed but allegedly installed only three of them. This discovery was only made after the four uninstalled devices were found under the desk of the consulting project manager (Nakashima and Krebs 2007). In this case, the federal agency, which lacked the ability and knowledge to install and monitor the intrusion detection devices, was forced to open its gate to the consultant but was subsequently deceived.

Constraining Opportunism

The root cause of opportunism is information asymmetry (Akerlof 1970). If information is completely available to both parties and they fully understand it, it is difficult for either to be opportunistic (Williamson 1973). A lack of equally shared information obviates the ability of one party from detecting, and thus deterring, the opportunistic acts of the other. If information is asymmetrically shared, the opportunistic party has little fear of being detected, and thus there is a low likelihood of adverse consequences. Therefore, a so inclined information-advantaged party is likely to be opportunistic.

The type of knowledge that each party holds is an important check on opportunism. Explicit knowledge can be captured, formalized, and codified into documents, procedures, or databases (Bassellier et al. 2001; Smith 2001). Educated people can, with a modicum of effort, learn relevant explicit knowledge. For instance, most office employees can, with adequate effort, absorb the applicable rules of spreadsheet operation and manipulation. It does not mean, however, that they will always make good decisions about when to use a spreadsheet (e.g., using multiple spreadsheets rather than a database). By contrast, tacit knowledge is the know-how and judgment that accompanies explicit knowledge (Polanyi 1967). In terms of our example, it is knowing *when* a spreadsheet is a good fit to the problem at hand rather than applying a spreadsheet to all problems. Said differently, tacit knowledge is about knowing when and how to apply explicit knowledge.

Tacit and explicit knowledge are present in all consulting projects, though the mix of each will vary (see Table 1). It is the level of each type of knowledge and the holder of the information asymmetry that sets the tone for a consulting project. In IS consulting, information asymmetry is bilateral, meaning that both parties have information that the other party lacks. Because of this, both parties have the capability to be opportunistic.

Table 1 - Information Asymmetry in IS Consulting (Dawson et al 2010-11)

Holder of Information Asymmetry Advantage	Explicit Knowledge Examples	Tacit Knowledge Examples
Consultant-Favored	Knowledge of emerging, envisioned technology, or application Access to additional knowledge about a new or planned product or approach Competitor's use (or planned use) of a new technology State of the art project management techniques	Deeper base of experience with a particular new/emerging technology Greater breadth and depth of technology experience More experience in process adaptiveness Broader experience on how technology could be employed at the client organization
Client-Favored	Knowledge of current assets or applications at the client organization Knowledge of skills of internal staff Current resource allocation	Better understanding of the current process, challenges and environment More insight into change management issues associated with service delivery within the organization Understanding the organizational culture and climate

Several mechanisms have been proposed to constrain opportunism. Agency theory acknowledges that the agent (consultant) may have an information asymmetry advantage but this advantage can be overcome via legal mechanisms (Eisenhardt 1989). According to agency theory, by using these legal mechanisms, a principal has the ability and the knowledge to create and enforce a contract to either oversee the actions of the agent or to align the goals of the actions of the agent with those of the principal. However, agency theory falters since IS consulting often uses coproduction, where both the client and the consultant work together to deliver the project and, without the involvement of both parties, the project is not delivered

(Dawson et al. 2010-11; Mills and Morris 1986). However, agency theory is not appropriate since it "neither describe[s] nor predict[s] the behaviors of principals…engage[d] in high levels of collaborative problem solving" (Parks and Conlon 1996, p. 836).

Under the principal-professional lens, consultants (professionals) are believed to have an information asymmetry advantage over the client and, due to the type of knowledge used by consultants, this advantage is often insurmountable (Sharma 1997). As a result, principals lack the requisite knowledge to create and enforce a contract and are thus forced to rely on social constraints to prevent opportunistic actions of the agents (Sharma 1997). However, the principal-professional lens also falters in regard to IS consulting. With its sole focus on social constraints, it dismisses legal constraints as possible mechanisms to control an opportunistic consultant. Further, by only considering consultant information asymmetry, it ignores client information asymmetry and the possible resulting client opportunism.

The theory of relationship constraints (TRC) addresses many of the problems with agency theory and the principal-professional lens. TRC considers both legal and social constraints, allows for bilateral information asymmetry and proposes that the effectiveness of the constraint mechanism is based on the amount of information asymmetry that is present as well as the type and amount of knowledge that is used in the project (Dawson et al. 2010-11). By doing so, TRC acknowledges information asymmetry as the root cause of opportunism and suggests that the effectiveness of a constraint mechanism is based on the level of information asymmetry as well as by the type of knowledge (tacit and explicit). As such, TRC suggests that the level of information asymmetry, and the amount of tacit and explicit knowledge determine the efficacy of a constraint mechanism. Because TRC considers legal constraints (like agency theory) and social constraints (like the principal-professional lens), it is appropriate for this study.

However, TRC by ignoring national culture, like agency theory and the principal-professional lens, implicitly suggest generalizability across cultures. Thus, this research asks, *does national culture factor in determining the effectiveness of different constraint mechanisms?*

National culture

National culture, which is defined as the homogeneity of characteristics that separates one human group from another (Hofstede 2001), provides a society's characteristic profile with respect to norms, values, and institutions, and affords an understanding of how societies manage exchanges (Hofstede 2001). With the fast pace of globalization in business and the increasingly integrated global economy, the role of national culture has been the topic of numerous studies focusing on various aspects of human behavior in cross-cultural business.

At the individual level, several studies have investigated the impact of national culture on individual behavior, including adoption of innovations (Lim and Park 2013), online review behavior (Lai et al. 2013), and computer-mediated communication (Tan et al. 1998). Researches focused on business leaders have shown the impact of national culture on leadership effectiveness (Den Hartog et al. 1999; Li et al. 2013), managers' perceptions in project management (Rees-Caldwell and Pinnington 2013), their ethical decision-making behavior (Beekun and Westerman 2012) and their perceptions about ethical behavior in intra- and cross-cultural negotiations (Elahee et al. 2002). At the firm level, national culture has been demonstrated to influence organizational learning (Skerlavaj et al. 2013), entry mode in another country (Slangen and van Tulder 2009) and foreign market acquisitions (Malhotra et al. 2011), investments in training and development (Coget 2011), capital structure decisions (Li, Dale, Yue and Zhao, 2011), knowledge resources sharing in inter-organizational relationships (Griffith and Harvey 2001) and formation of technology alliances (Steensma et al. 2000).

While numerous frameworks of national culture exist, Hofstede's (2001) work is one of the most widely used. Hofstede (2001) identifies five dimensions along which countries can be classified: power distance, individualism, uncertainty avoidance, masculinity (more appropriately labeled the gender distribution of roles), and long-term orientation. He argues that a country can be positioned along these five dimensions to provide an overall summary of a country's cultural type (Griffith, Myers, and Harvey, 2006). According to Hofstede's national culture index,[1] China and the US, the two counties under investigation in this study,

[1] Available at Hofstede's official website: http://geert-hofstede.com/ (last visited on August 5, 2013)

have substantially different national cultures.

In terms of *power distance*, China is much higher than the US, which means the Chinese culture accepts and reinforces the fact that power is distributed unevenly in society. Chinese people accede to status differences and are expected to show proper respect to their superiors (Ghemawat and Reiche 2011). By contrast, those in the U.S. believe that all individuals, regardless of status or permission, are created equally and should be treated accordingly. As a result, in the U.S., organizational hierarchy is a matter of convenience while it China it reflects an individual's status (Hofstede and Minkov 2010).

For *individualism*, the U.S. is higher than China, which means the U.S.'s culture shows a relative preference for the individual over the group. Compared with their Chinese peers, U.S. residents tend to maintain loose social structures that are characterized by independence, the importance of individuals' rights and the recognition of personal initiative and achievement. In China, people think primarily about the good of the group rather than that of the individual (Ghemawat and Reiche 2011).

China ranks lower than the U.S. in *uncertainty avoidance*, which means Chinese culture is more willing to accept and deal with ambiguous or risky situations, while U.S. culture favors structure and predictability, which results in explicit rules of behavior and strict laws (Ghemawat and Reiche 2011). As a result, businesses in China tend to be small or medium sized and are often family-owned (Hofstede and Minkov 2010).

In terms of the *gender distribution of roles*, both China and the U.S. rank high on the index. Cultures in which some roles are almost exclusively reserved for men are thought to reflect a dominance of tough values such as achievement, assertiveness, competition and material success, which are almost universally associated with male roles (Hofstede and Minkov 2010). Firms in such cultures put more emphasis on employees' bottom-line performance rather than caring about overall employee well-being (Ghemawat and Reiche 2011).

In terms of *long-term orientation*, China ranks higher than the U.S. Therefore, Chinese people, compared with their U.S. peers, tend to believe that truth depends very much on situation, context and time so that they show an ability to adapt traditions to changed conditions, display a strong propensity to save and invest, practice thriftiness, and persevere in achieving results (Hofstede 2001). By contrast, those in the U.S. adopt a shorter term orientation and this drives individuals to strive for "quick hits" results and to also strive to learn the "absolute truth" in all matters (Hofstede and Minkov 2010).

National cultural values can affect the interests, priorities, and the strategies that people use in dealing with their business partners (Brett 2001). For example, firms in societies characterized by a long-term orientation tend to be directed toward building long-term relationships with their business partners (Barkema and Vermeulen 1997). People in such a culture tend to spend time and effort in establishing trust and commitment with their partners over a long series of business interactions, therefore, they may refrain from opportunistic behaviors in order not to ruin a relationship, a triumph of the drive to bond over that to acquire.

Other national cultural dimensions such as power distance and individualism have also been found to moderate the relation between human development and cheating behaviors such as corruption (Sims et al. 2012). Variations in individualism are suggested as a potential explainer of differences in opportunistic behaviors among cultures (Chen et al. 2002). A meta-analysis by Steenkamp and Geyskens (2012) recognizes the relationship between national culture and transaction cost economics, the theory in which opportunism is rooted.

Based on prior theory and empirical analysis, our research proposition follows and is graphically shown in Figure 1

P1. National culture will influence the effectiveness of opportunism constraint mechanisms.

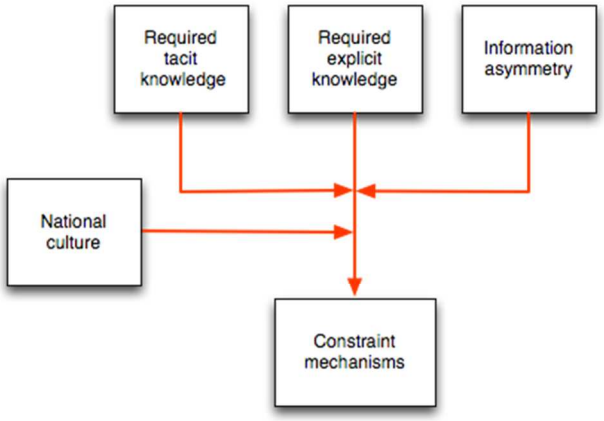

Figure 1 – Research Model

Given that TRC, along with agency theory and the principal-professional lens, is silent on national culture, it implicitly suggest that national culture is not relevant. We are unable to find prior research testing this contention for any of our theory bases, and thus this study fills a gap in two key critical areas of modern business, namely cross-cultural behavior and opportunism.

Methodology and Data Collection

Policy-capturing studies use regression-based method to discern how individuals make decisions in response to a series of stimuli (Aiman-Smith et al. 2002). Based on path significance and regression coefficients, a researcher can understand more and better interpret a respondent's policy-making process. Similar methodologies include conjoint analysis or trade-off analysis in marketing (Cattin and Wittik 1983; Green and Srinivasan 1990), protocol analysis in information systems (Mackay et al. 1992), contingent choice or analytical hierarchical process in social policy research (Mackenzie 1993). Despite the distinctions in terminology, differences in the techniques are minimal (Aiman-Smith et al. 2002).

Operationalization of constructs

Under TRC, three independent attributes are used to predict the type of constraint mechanism: the levels of explicit and tacit knowledge and information asymmetry. We closely followed the TRC definitions used in Dawson et al. (2010-11) to operationalize each construct, and used their typology to identify IS consulting projects that have varying levels of tacit and explicit knowledge. For each attribute, we use a two-level predictor (high/low) for dual reasons. First, our primary goal is to understand the importance of each attribute in predicting the perceived efficacy of each constraint mechanism, and a two-level predictor provides sufficient insight. Second, the required number of scenarios increases substantially as the number of predictor levels rises. Using two-level predictors, the analysis can be conducted with a total of eight scenarios, which results in a fully orthogonal research instrument that respondents could reasonably be asked to complete. Theoretically, eight scenarios were identified, but during the pilot phase, we realized that one was infeasible from a practical sense (discussed later), so it was excluded from consideration.

We are aware that game theory has been used to understand opportunism in contracting situations. Under game theory, the strategy of mutual cooperation produces higher payoffs over time than other strategies. However, for an initial encounter, competition rather than cooperation is more beneficial (Axelrod and Hamilton 1981). As such, we acknowledge that, over some period of time, participants may eventually come to this realization and cease (or greatly reduce) opportunistic actions. Hence, to avoid imprecision, in our instructions we notified our participants to assume that this is their first interaction with the lead consultant and the consulting firm. By doing so, it was unlikely that either party would immediately adopt a cooperative strategy. We readily acknowledge that, if we assumed repeated and

regular interactions between the client and the consultant, our results could be different. While either result is potentially interesting, we chose to focus on the early stage of the relationship.

We conducted the study in the world's two largest economies, the United States and China. The economic activities of both countries are highly intertwined. The United States and China also typify the Hofstede's cultural divide and provide a potential way to understand the relationship between national culture and the constraint of opportunism.

Scenario Development

Policy-capturing research is dependent on realistic scenarios that match the domain of interest (Aiman-Smith et al. 2002). We sought initial inspiration for our scenarios from procurements that were listed on the State of California's Procurement Division's website for active contracts. We identified projects with different levels of tacit and explicit knowledge and used several of these projects to create our scenarios. Because the procurement documents were so lengthy (ranging from 50 to 200 pages), it was necessary to summarize them. Each of the procurement documents used to inspire the scenarios was summarized in 3 to 4 paragraphs. This use of actual projects as a foundation for the scenarios increased their realism. We were not able to identify a procurement to meet one of the requirements: high information asymmetry, low tacit knowledge, and low explicit knowledge. As a result, we were forced to create a scenario that met these requirements and matched the tone and level of detail of the other scenarios.

The original scenarios were written and tested in English. A first pilot test with twelve respondents was conducted. The respondents were IS consultants or clients known by the first author from his past professional career. The first pilot test was a manipulation check to see if the respondents correctly associated each scenario with the intended levels of tacit and explicit knowledge and information asymmetry. The respondents were provided with a definition and description of all three attributes and, for each scenario, respondents were asked to provide an estimate of each attribute's level. The definitions provided were consistent with those used in Dawson et al. (2010-11). In addition, respondents were asked to judge the level of realism of each scenario. The results from the first pilot test revealed some problems. In several scenarios, the levels of tacit and explicit knowledge were not clear and respondents did not consistently and correctly distinguish between high versus low levels of information asymmetry. All of the respondents judged the realism of the scenarios to be high, with the exception of the fabricated scenario. The respondents argued that they could not envision a case where the information asymmetry would be high (reflecting that the client would be very unfamiliar with the project) while the level of tacit and explicit knowledge would be low (thus indicating an easy project). Upon reflection, we agreed with this viewpoint and dropped the fabricated scenario. While we are aware that this unbalanced our previously orthogonal design, removing the fabricated scenario was the right step to take to maintain realism and authenticity in responses.

After these modifications, the revised instrument was sent to eight new pilot testers to judge the manipulation levels (i.e., Levels of tacit/explicit knowledge and level of information asymmetry) and to assess to realism of each scenario. This time, all judges viewed scenario realism as high. Of the total of 24 manipulation checks (eight testers each assessing all three manipulations), a total of 22 were correct. The probability of getting 22 correct matches out of 24 under a binomial distribution, assuming random selection (i.e., $p=0.5$), is 0.0001, thus we concluded that the scenarios met the research goals. We removed the manipulation checks from the instrument and finalized the U.S. version.

Once the surveys were finalized, we translated them into Chinese using a double back-translation process. The seven scenarios were first translated into Chinese by two IS scholars who are proficient in Chinese and English and have had studying and living experience in an English-speaking country for more than one year. One of the Chinese scholars completed a PhD in an English speaking country and now works there. The original seven scenarios were extracted from the U.S. context, which might mean that some were not familiar or relevant to Chinese respondents. Minor and necessary adaptations were made. For example, in Scenario 2 the client firm was a major bridge builder in the State of California. In the Chinese version the client firm was revised to a major bridge builder in China. In Scenario 6, "Christmas" was changed to a Chinese equivalent festival, "Spring Festival", and "60 Minutes and the Wall Street Journal" was revised to "China Central Television and national major journals." Other than that, all the key facts were consistent across both versions. Then we asked a language expert who was unfamiliar with the research content to translate the Chinese version into English. We sent the back-translation to the authors

of the original questionnaire to make sure that the translation was accurate and the changes were suitable. Given their feedback and comments, another round of minor revision was done and then we refined the translation of English instrument into the final Chinese version.

We conducted a pilot test with eight MBA students in a Chinese University who were clients of IS consultants. We gave them an introduction with the definition and description of three attributes, which was adopted from Dawson et al. (2010-11). The purpose was to make sure the respondents understand the linkage between each scenario and the underlying levels of tacit and explicit knowledge and information asymmetry. The same manipulation check was done in China and revealed that, out of the 24 manipulation checks, 21 were done correctly. The probability of getting 21 correct matches out of 24 under a binomial distribution (assuming random selection of p=0.5) is .001. Thus we concluded that the Chinese scenarios also met our research goals. Table 2 summaries the attributes in each scenario.

Table 2 - Summary of scenarios

		Level of		
Number	Scenario	Info Asymmetry	Explicit Knowledge	Tacit Knowledge
1	Complex software development of a commercial-off-the-shelf (COTS) financial system	High	High	High
2	Assessment of disaster recovery readiness	High	Low	High
3	Greening of a data center	High	High	Low
4	Development of a complex secure electronic communications and information processing network	Low	High	High
5	Developing and rolling out a new organizational structure	Low	Low	High
6	Data center equipment installation	Low	High	Low
7	Building microwave connectors	Low	Low	Low

Data collection – United States

Data collection was first conducted in the U.S. Since the primary people dealing with IS consultant opportunism are IS project managers, the instrument was sent to 240 experienced project managers (or people holding similar positions) who were part of the first author's LinkedIn contacts. In keeping with policy-capturing protocol (Aiman-Smith et al. 2002), we sent an introductory message that described the purpose and process of the research without revealing the proposition. Since all of the respondents were experienced in managing consultants, they were simply directed to answer questions based on their experience. We also described the source of information for the scenarios since doing so could increase the respondents' perceptions of realism and rigor (Aiman-Smith et al. 2002).

In particular, we asked each respondent to judge the effectiveness of each of the eight constraints (see Table 3) for each of the seven scenarios. The constraints were split evenly between legal and social methods. We specifically did not ask them which constraint(s) they generally used; rather, we had them focus on how effective the particular constraint would be for a specified scenario. In short, we stressed what each respondent believed would be most effective, regardless of how often their organization used that or other constraints. As such, our research was designed to be normative rather than descriptive.

Table 3: Constraints*

Constraint	Definition	Source	Type
Firm Fixed Price Contract	A contract where a set amount of work is performed for a set price	Eisenhardt (1989)	Legal
Time and Materials	A contract where a client buys a certain	Eisenhardt (1989)	Legal

Contract	number of hours of a consultant's time		
Purchase Order	A brief contract that specifies the product/service to be delivered and its cost	Dawson et al 2010-11	Legal
Incentive Contracts	An addition to a contract that specifies a bonus for certain actions (e.g. faster delivery)	Dawson et al 2010-11	Legal
Advisor Firm Participation (Third party control)	The hiring of another consulting firm to help oversee the consultant	Sharma (1997) Dawson et al 2010-11	Social
Chain of Command (Bureaucratic Control)	The use of the consultant's chain of command within his/her consulting firm	Sharma (1997) Dawson et al 2010-11	Social
Self Control	Reliance on a consultant's personal ethics	Sharma (1997) Dawson et al 2010-11	Social
Professional Reputation (Informal Community)	Reliance on the lead consultant's desire to maintain his/her public reputation for integrity and honesty	Dawson et al 2010-11	Social

* The constraint name provided to respondents is shown in the constraint column. The term within parenthesis is what is commonly used in academic literature.

A total of 50 people responded (20.8%) with the completed answers. With policy-capturing research, the unit of analysis is an individual response to a scenario. With 50 respondents for seven scenarios, the U.S. sample size is 350, which demonstrates sufficient power. Reliability rises and standard error falls if a single individual responds to multiple scenarios as opposed to having multiple individuals responding to a single scenario (Howell 1992).

Data Collection - China

A large-scale survey was conducted in China from May to July 2012. The target respondents were those dealing with IS consultants. In the first page of questionnaire we highlighted one item asking whether the respondent had working experience as an IS consultant or as a client of an IS consultant. If they had not had one of the two experiences, they were excluded.

We collected data in two ways. First, we solicited contacts from MBA students in the full time MBA program in a major Chinese university. Based on the contacts provided by the students, we sent 50 questionnaires to IS consultants or their clients and received 33 valid questionnaires, leading to a response rate of 66%. Secondly, 25 questionnaires were sent out to clients of IS consultants known by one of the paper authors from her past professional career, and we received 21 valid responses, leading to a valid response rate of 84%. In total, we sent out 75 questionnaires and received 54 valid returns, resulting to a valid response rate of 72%. With 54 respondents for seven scenarios, the Chinese sample size is 378, slightly larger than the U.S. study and also demonstrates sufficient power.

For both the Chinese and U.S. data collection, we acknowledge our respondents may be viewed as a convenience sample, however, all research favors one goal over another (McGrath 1982). Since our primary goal is internal validity, as is the case in a laboratory experiment, we were willing to lower external validity in the pursuit of causal precision, the dominant goal when manipulating stimuli and measuring outcomes.

Findings and Interpretation

Analysis

We applied a repeated-measures general linear model (GLM) analysis using a restricted maximum

likelihood (REML). We first calculated the means for each constraint within each scenario and then conducted a multivariate analysis of variance (MANOVA). An assumption of GLM procedure is that the underlying errors are all uncorrelated with homogeneous variance. Both data sets satisfy the homogeneity of variance assumption when examined using Box's test (US: p=0.182; China: p=0.461). A MANOVA is statistically significant (US: $p < 0.01$; China: $p < 0.01$). The effect size, using partial eta squared, indicates a moderate effect. In order to test the relationship between each constraint and the three attributes, we ran a linear regression analysis (Table 4).

Table 4 - Regression coefficients and significance

Source	Info Asymmetry (I)	Explicit Knowledge (E)	Tacit Knowledge (T)	I*E	I*T	E*T
Firm Fixed Price Contract						
US	0.162 (0.346)	0.108 (0.275)	0.117 (0.239)	-0.274 (0.784)	-0.090 (0.483)	-0.207 (0.107)
China	-0.013 (0.939)	-0.035 (0.711)	**-0.231 (0.015)**	-0.088 (0.471)	0.007 (0.954)	0.088 (0.471)
Time and Material Contract						
US	-0.062 (0.710)	-0.023 (0.831)	-0.059 (0.545)	-0.146 (0.240)	-0.122 (0.327)	0.086 (0.490)
China	-0.185 (0.260)	0.060 (0.525)	-0.115 (0.227)	-0.009 (0.940)	0.090 (0.461)	-0.027 (0.822)
Purchase order						
US	0.299 (0.080)	-0.110 (0.265)	-0.185 (0.062)	-0.173 (0.174)	**-0.267 (0.036)**	0.161 (0.205)
China	0.069 (0.679)	-0.031 (0.746)	-0.148 (0.122)	-0.047 (0.703)	0.007 (0.957)	0.113 (0.360)
Incentive contract						
US	**-0.615 (0.000)**	**0.312 (0.001)**	0.094 (0.333)	**0.383 (0.002)**	**0.354 (0.005)**	**-0.389 (0.002)**
China	-0.142 (0.386)	**0.276 (0.004)**	0.106 (0.263)	-0.008 (0.945)	0.167 (0.172)	**-0.336 (0.006)**
Advisor firm participation						
US	-0.055 (0.732)	0.059 (0.526)	**0.243 (0.009)**	0.228 (0.056)	**0.261 (0.029)**	**-0.245 (0.041)**
China	0.251 (0.118)	0.033 (0.721)	0.169 (0.069)	-0.053 (0.659)	-0.021 (0.859)	-0.060 (0.614)
Chain of command						
US	-0.193 (0.261)	0.121 (0.223)	**0.246 (0.014)**	0.098 (0.446)	0.089 (0.486)	**-0.257 (0.046)**
China	0.151 (0.360)	0.019 (0.838)	0.032 (0.738)	-0.153 (0.213)	-0.031 (0.798)	-0.089 (0.471)
Self control						
US	-0.033	0.150	**0.247**	0.015	-0.014	-0.157

	(0.847)	(0.133)	**(0.013)**	(0.910)	(0.913)	(0.222)
China	0.237 (0.151)	0.084 (0.377)	0.088 (0.357)	-0.205 (0.096)	-0.066 (0.590)	-0.085 (0.488)
Professional reputation						
US	0.068 (0.667)	**0.197** **(0.033)**	**0.583** **(0.000)**	0.179 (0.131)	-0.070 (0.552)	**-0.503** **(0.000)**
China	0.168 (0.304)	0.053 (0.573)	**0.235** **(0.013)**	-0.085 (0.486)	-0.097 (0.427)	-0.170 (0.163)

The first number is the regression coefficient while the numbers in parentheses report its p-value. Bolded cells indicate significance at p = 0.05

Overall, the regression results indicate that the levels of information asymmetry, tacit and explicit knowledge explain constraint mechanism effectiveness both in the United States and China. Thus, there is support for the central tenet of TRC. As the intention of this paper is to explore culture differences, we now use independent samples t-tests to compare the effectiveness of each constraint under each scenario. The full analysis, found in Appendix A and summarized in Table 5, shows the differences that distinguish the U.S. and China.

Table 5: Summary of comparative analysis

Scenario	Interpretation of t-tests
Complex software development of a commercial-off-the-shelf (COTS) financial system	Time and materials contracts and purchase orders are significantly more effective in China than the U.S., while chain of command and professional reputation are significantly more effective in the U.S. than in China.
Assessment of disaster recovery readiness	Time and materials contracts, purchase orders, and incentive contracts are significantly more effective in China than in the U.S., while, professional reputation is significantly more effective in the U.S. than in China.
Greening of a data center	Time and materials contracts and purchase orders are significantly more effective in China than in the U.S., while, professional reputation is significantly more effective in the U.S. than in China.
Development of a complex secure electronic communications and information processing network	Purchase orders and advisor firm participation are significantly more effective in China than in the U.S.
Developing and rolling out a new organizational structure	Purchase orders are significantly more effective in China than in the U.S., while, chain of command and professional reputation are significantly more effective in the U.S. than in China.
Data center equipment installation	Purchase orders and incentive contracts are significantly more effective in China than in the U.S.
Building microwave connectors	Firm fixed price contract and purchase orders are significantly more effective in China than in the U.S.

The results of the t-tests confirm that national culture moderates the relationship between the independent variables (information asymmetry, level of tacit and explicit knowledge) and the dependent variable (effectiveness of constraint mechanisms). Given that moderators are qualitative or quantitative variables that effect the direction and strength of the relationship between independent and dependent variables (Baron and Kenny 1986), we can conclude that moderation exists and this provides support for our research proposition.

Overall, we find that firm fixed price contracts, time and materials contracts, and purchase orders are

significantly more effective in China than in the U.S. Chain of command and professional reputation are significantly more effective in the U.S. than in China. These findings suggest that contractually oriented constraints (e.g., Time and materials contracts) are more effective in China, whereas the socially oriented constraints (e.g., Professional reputation) are more effective in U.S. A t-test confirms that legal constraints are more perceived to be more effective in China (mean=3.58) than the U.S. (mean=3.24) with $p < 0.001$, Social constraints are perceived more effective in the U.S. (mean=3.51) than China (mean=3.38), with $p = 0.014$. We now consider some possible cultural explanations for these findings.

The divide in the guilt and shame culture (Creighton 1990) between the U.S. and China possibly explains the situation. Chinese culture is a typical example of a shame culture where people can do wrong things so long as they don't get caught. This is related to high collectivism where people care about how other people in the community see them and low uncertainty avoidance (i.e., people are used to taking advantage of ambiguous situations). This may explain why the clients of IS consultants in China prefer legal constraints with the consequences of breaking the contract clearly defined. While most western countries are classified under guilt cultures, where people feel remorse when behaving badly no matter whether they are caught. Thus, socially oriented constraints could be perceived to be more effective in the U.S.

Power distance provides another possible explanation. Chinese culture is a higher power distance culture than the U.S. High power distance is associated with respect for authority, centralized decision-making, and rigid/authoritative structures (Hofstede 1993; Hofstede 2001; Singh et al. 2005). A senior executive in a high power distance culture can have more privileges and is more able to punish subordinates for wrong-doings than one in a lower power distance culture (Cho et al. 1998). When dealing with an outside consulting company, a manager in a high power distance culture concerned about being possibly blamed for not protecting the company's interest well enough, may choose a rigid structure such as a legal constraint. Whereas a manager in a lower power distance culture might be willing to rely more on social constraints.

In both the U.S. and Chinese samples, the effectiveness of constraint mechanisms vary based on the level of information asymmetry, tacit and explicit knowledge present. Thus, there is support for the basic concepts of TRC. However, the significance of different attributes for the U.S. and Chinese samples and the variability of the effectiveness of the constraint mechanisms between the countries suggest the importance of considering culture in the understanding of the perceived effectiveness of constraint mechanisms. The findings indicate that culture plays an important moderating role. Because the U.S. and China differ on several dimensions of national culture, it is difficult to ascertain which dimensions of national culture are most salient in the moderation. However, it is clear that national culture influences the relationships and this is an important finding from this research.

Further research is needed to ascertain which of the cultural differences explains the divide between legal and social constraints. It might be, however, that given the collective and reinforcing nature of cultural factors, we might not be able to go further than showing a difference between the Chinese and U.S. cultures.

Discussion and Summary

Like all studies, this one has its limitations. First, while we developed the short scenarios from lengthy procurement documents and tested their realism, we did not test whether respondents reacted identically to the complete document as compared to the précis used as a scenario. Second, we acknowledge that we did not test for every possible constraint mechanism and focused on those frequently found in the IS literature and practice. Third, we did not attempt to control every possible condition, such as characteristics of the client or the consultant. Fourth, information asymmetry covers a multitude of omissions in terms of explanatory variables, such as the consultant's long-term goals vis-à-vis the client. There are some things neither party will ever fully reveal, but this is what makes constraints so critical in managing relationships and research in this area important and challenging. Fifth, we acknowledge that we limited our focus to the initial encounter between the client and consultant. Future encounters, if resulting from regular and repeated interactions, may yield different answers. Finally, we acknowledge that other theoretical lenses exist and may offer additional insights.

An implication of the research findings from culture perspective is that even though the world economy is

more global and there is greater cross-cultural interactivity between organizations, business best practices in one culture may not be effective in another culture. More specifically, the legal constraints that are effective in a collectivistic culture in IS consulting may not be effective for an individualistic culture, whereas the reverse applies to social constraints As a result, global corporations, when providing IS consulting services, should be wary of transporting successful constraint mechanism from one culture directly to another. Instead, they need to observe local practices and adapt to these circumstances. Specifically, U.S. consulting firms might find that relying on social constraints to limit opportunism in a Chinese setting might lead to higher levels of opportunism. Alternatively, Chinese consulting firms working for U.S. companies might find that an aggressively legalistic approach to avoiding opportunism might damage their professional image and relationship with the client.

Conclusion

Opportunism is innate to human behavior because it arises from our drive to acquire, but it is also held in check by our drive to bond. Thus, we can expect opportunism to be common to all cultures and also to discern in each culture constraint mechanisms. Nevertheless, cultures vary, and thus they have likely developed different culturally apt measures to constrain opportunism. What is surprising, given the innate nature of opportunism and the extensive research on agency theory, is that there has been little investigation on cultural variations in constraining opportunism. In the context of IS consulting, a large global industry, we found that cultural differences exist in terms of preferences for legal and social mechanisms for constraining opportunism. We offer several rationales for the findings based upon differences in cultural dimensions, but further research is needed to refine this explanation.

We don't believe that there is anything peculiar to IS consulting that might suggest that different findings would emerge from examining other business relationships. If future researchers find differences, TRC by accounting for information asymmetry and type of knowledge provides a theoretical framework for explaining the situation. It is also important to recognize that this research is based on an information-centered theory in that TRC's three elements are about information-oriented concepts. Thus, this work is a contribution to the practice of IS consulting and the theoretical development of IS.

References

Aiman-Smith, L., Scullen, S., and Barr, S. 2002. "Conducting Studies of Decision Making in Organizational Contexts: A Tutorial for Policy-Capturing and Other Regression-Based Techniques," *Organizational Research Methods* (5), pp. 388 - 414.

Akerlof, G. 1970. "The Market for 'Lemons': Quality Uncertainty and Market Mechanisms," *Quarterly Journal of Economics* (84), pp. 488-500.

Axelrod, R., and Hamilton, W.D. 1981. "The Evolution of Cooperation," in: *Science*. pp. 1390-1396.

Barkema, H., and Vermeulen, G.A.M. 1997. "What Differences in the Cultural Backgrounds of Partners Are Detrimental for International Joint Ventures?," *Journal of International Business Studies* (28:4), pp. 845-864.

Baron, R.M., and Kenny, D.A. 1986. "The Moderator-Mediator Variable Distinction in Social Psychological Research: Conceptual, Strategic, and Statistical Considerations," in: *Journal of Personality and Social Psychology*. p. 11731182.

Bassellier, G., Reich, B.H., and Benbasat, I. 2001. "Information Technology Competence of Business Managers: A Definition and Research Model," *Journal of Management Information Systems* (17:4), pp. 159-182.

Beekun, R., and Westerman, J. 2012. "Spirituality and National Culture as Antecedents to Ethical Decision-Making: A Comparison between the United States and Norway," *Journal of Business Ethics* (110:1), pp. 33-44.

Brett, J.M. 2001. *Negotiating Globally*. San Francisco, CA:

Cattin, P., and Wittik, D. 1983. "Commercial Use of Conjoint Analysis: A Survey," *Journal of Marketing* (46), pp. 45-53.

Chen, C.C., Peng, M.W., and Saparito, P.A. 2002. "Individualism, Collectivism, and Opportunism: A Cultural Perspective on Transaction Cost Economics," *Journal of Management* (28:4), pp. 567-583.

Cho, D.S., Kim, D.J., and Rhee, D.K. 1998. "Latecomer Strategies: Evidence from the Semiconductor Industry in Japan and Korea," *Organization Science* (9:4), pp. 489-505.

Coget, J. 2011. "Does National Culture Affect Firm Investment in Training and Development?," *Academy of Management Prospectives* (25:4), pp. 85-87.
Creighton, M.R. 1990. "Revisiting Shame and Guilt Culture: A Forty-Year Pilgrimage," *Ethos*), pp. 279-307.
Dawson, G.S., Watson, R.T., and Boudreau, M.C. 2010-11. "Information Asymmetry in Is Consulting: Towards a Theory of Relationship Constraints," *Journal of Management Information Systems* (27 (Winter):3), pp. 145-180.
Den Hartog, D.N., House, R.J., Hanges, P.J., Ruiz-Quintanilla, S.A., and Dorfman, P.W. 1999. "Cultural Specific and Cross-Culturally Generalizable Implicit Leadership Theories: A Longitudinal Investigation," *The Leadership Quarterly* (10:2), pp. 219-256.
Eisenhardt, K. 1989. "Agency Theory: An Assessment and Review," in: *Academy of Management Review*. pp. 57-75.
Elahee, M.N., Kirby, S.L., and Nasif, E. 2002. "National Culture, Trust and Perceptions About Ethical Behavior in Intra- and Cross-Cultural Negotiations: An Analysis of the Nafa Countries," *Thunderbird International Business Review* (44:6), pp. 799-818.
Ghemawat, P., and Reiche, S. 2011. "National Cultural Differences and Multinational Business." Globalization Note Series.
Green, P., and Srinivasan, V. 1990. "Conjoint Analysis in Marketing: New Develops with Implications for Research and Practice," *Journal of Marketing* (54), pp. 3-19.
Griffith, D.A., and Harvey, M.G. 2001. "A Resource Perspective of Global Dynamic Capabilities," *Journal of International Business Studies* (32:3), pp. 597-606.
Hofstede, G. 1980. *Culture's Consequences: International Differences in Work-Related Values*. Beverly Hills, CA: Sage.
Hofstede, G. 1993. "Cultural Constraints," *Academy of Management Executive* (7:1), pp. 81-94.
Hofstede, G. 2001. *Comparing Values, Behaviors, Institutions and Organizations across Nations*. Thousand Oaks, CA: Sage.
Hofstede, G., and Minkov, M. 2010. *Cultures and Organizations: Software of the Mind*. New York: McGraw-Hill.
Howell, D. 1992. *Statistical Methods for Psychology*. Boston:
Jones, T.M. 1995. "Instrumental Stakeholder Theory: A Synthesis of Ethics and Economics," *Academy of Management Review* (20:2), pp. 404-437.
Lai, J.W., He, P., Chou, H.M., and Zhou, L. 2013. "Impact of National Culture on Online Consumer Review Behavior," *Global Journal of Business Research* (7:1), pp. 109-115.
Lawrence, P.R. 2007. *Being Human: A Darwinian Theory of Human Behavior*. Unpublished draft <**http://prlawrence.com/beinghumandownload.html%3E**.
Lawrence, P.R., and Nohria, N. 2002. *Driven : How Human Nature Shapes Our Choices*. San Francisco: Jossey-Bass.
Leopore, J. 2009. "Not So Fast: Scientific Management Started as a Way to Work. How Did It Become a Way of Life?," in: *The New Yorker*.
Li, J., Tan, Y.L., Cai, Z.Y., Zhu, H., and Wang, X.R. 2013. "Regional Differences in a National Culture and Their Effects on Leadership Effectiveness: A Tale of Two Neighboring Chinese Cities," *Journal of World Business* (48:1), pp. 13-19.
Lim, H., and Park, J.S. 2013. "The Effects of National Culture and Cosmopolitanism on Consumers' Adoption of Innovation: A Cross-Cultural Comparison," *Journal of International Consumer Marketing* (25:1), pp. 16-28.
Mackay, J., Barr, S., and Kletke, M. 1992. "An Empirical Investigation of the Effects of Decision Aids on Problem-Solving Processes," *Decision Science* (23), pp. 648-672.
Mackenzie, J. 1993. "A Comparison of Contingent Preference Models," *American Journal of Agricultural Economics* (75), pp. 593-603.
Malhotra, S., Sivakumar, K., and Zhu, P.C. 2011. "A Comparative Analysis of the Role of National Culture on Foreign Market Acquisitions by U.S. Firms and Firms with Emerging Countries," *Journal of Business Research* (64:7), pp. 714-722.
Mastens, S.E. 1993. "Transaction Costs, Mistakes, and Performance: Assessing the Importance of Governance.," *Managerial and Decision Economics* (14), pp. 119-129.
McGrath, J.E. 1982. "Dilemmatics: The Study of Research Choices and Dilemmas," in: *Judgment Calls in Research B2 - Judgment Calls in Research,* J.E. McGrath (ed.). Beverly Hills, CA: Sage, pp. 69-80.
Mills, P.K., and Morris, J.H. 1986. "Clients as Partial Employees of Service Organizations: Role

Development in Client Participation," *Academy of Management Review* (11:4), pp. 726-735.
Nakashima, E., and Krebs, B. 2007. "Contractor Blamed in Dhs Breaches," in: *Washington Post*. Washington, DC.
Parks, J.M., and Conlon, E.J. 1996. "Compensation Contracts: Do Agency Theory Assumptions Predict Negotiated Agreements," *Academy of Management Journal* (38:3), pp. 821-838.
Polanyi, M. 1967. *The Tacit Dimension*. Garden City, N.Y.:
Rees-Caldwell, K., and Pinnington, A.H. 2013. "National Culture Differences in Project Management: Comparing British and Arab Project Managers' Perception of Different Planning Areas.," *International Journal of Project Management* (31:2), pp. 212-227.
Sharma, A. 1997. "Professional as Agent: Knowledge Asymmetry in Agency Exchange," *Academy of Management Review* (22:3), pp. 758-798.
Sims, R.L., Gong, B., and Ruppel, C.P. 2012. "A Contingency Theory of Corruption: The Effect of Human Development and National Culture," *Social Science Journal* (49:1), pp. 90-97.
Singh, N., Zhao, H., and Hu, X. 2005. "Analyzing the Cultural Content of Web Sites: A Cross-National Comparison of China, India, Japan and Us," *International Marketing Review* (22:2), pp. 129-146.
Skerlavaj, M., Su, M., and Huang, C. 2013. "The Modering Effects of National Culture on the Development of Organisational Learning Culture: A Multilevel Study across Seven Countries," *Journal for East European Management Studies* (18:1), pp. 97-134.
Slangen, A.H.L., and van Tulder, R.J.M. 2009. "Cultural Distance, Poltical Risk, or Governance Quality? Towards a More Accurate Conceptualization and Measurement of External Uncertainty in Foreign Entry Mode Research," *International Business Review* (18:3), pp. 276-291.
Smith, E. 2001. "The Role of Tacit and Explicit Knowledge in the Workplace," in: *Journal of Knowledge Management*. pp. 311-321.
Steensma, H.K., Marino, L., Weaver, M., and Dickson, P. 2000. "The Influence of National Culture on the Formation of Technology Alliances by Entrepreneurial Firms," in: *Academy of Management Journal*. pp. 951-973.
Stewart, M. 2009. *The Management Myth: Why the "Experts" Keep Getting It Wrong*. New York: W.W. Norton & Company, Inc.
Tan, B.C.Y., Wei, K.K., Watson, R.T., Clapper, D.C., and McLean, E.R. 1998. "Computermediated Communication and Majority Influence: Assessing the Impact in an Individualistic and a Collectivistic Culture," in: *Management Science*. pp. 1263-1278.
Wathne, K.H., and Heide, J.B. 2000. "Opportunism in Interfirm Relationships: Forms, Outcomes, and Solutions," *Journal of Marketing* (64), pp. 36-51.
Williamson, O.E. 1973. "Markets and Hierarchies: Some Elementary Considerations," *American Economic Review* (63:2), pp. 316-325.
Williamson, O.E. 1985. *The Economic Institutions of Capitalism : Firms, Markets, Relational Contracting*. New York: Free Press.
Williamson, O.E. 1993. "Opportunism and Its Critics," *Managerial and Decision Economics* (14), pp. 97-107.

Appendix A

Independent-samples T test on the comparison of Chinese and U.S. samples

Constraints	China	US	Levene's Test for equality of variances	T Test[a] (Significance)
	Mean (Std. Deviation)	Mean (Std. Deviation)	Sig.	
Scenarios 1 (High Info Asymmetry, High Explicit Knowledge and High Tacit Knowledge)				
Firm fixed price contract	3.31 (1.146)	3.18 (1.137)	0.787	0.601 (0.549)
Time and materials contracts	3.43 (0.924)	2.80 (1.178)	0.016	**2.999(0.003)**

Purchase orders	3.69 (0.907)	2.50 (1.249)	0.003	**5.498(0.000)**
Incentive contracts	3.43(0.964)	3.64 (1.045)	0.683	-1.087(0.280)
Advisor firm participation	3.69 (0.843)	3.96 (0.903)	0.941	-1.606(0.111)
Chain of command	3.07 (0.949)	3.52 (0.814)	0.805	**-2.563(0.012)**
Self control	3.24 (0.910)	3.52 (0.909)	0.991	-1.565(0.121)
Professional reputation	3.35 (1.031)	3.92 (0.695)	0.000	**-3.317(0.001)**
Scenarios 2 (High Information Asymmetry, Low Explicit Knowledge, High Tacit Knowledge)				
Firm fixed price contract	3.39 (0.979)	3.55 (1.174)	0.177	-0.764(0.447)
Time and materials contracts	3.39 (0.856)	3.00 (1.021)	0.332	**2.102(0.038)**
Purchase orders	3.61 (0.878)	2.80 (1.190)	0.038	**3.924(0.000)**
Incentive contracts	3.36 (0.896)	2.94 (1.008)	0.527	**3.681(0.000)**
Advisor firm participation	3.89 (0.861)	3.86 (1.155)	0.095	0.159(0.874)
Chain of command	3.55 (0.902)	3.61 (0.786)	0.363	-0.389(0.698)
Self control	3.70 (1.021)	3.53 (0.892)	0.411	0.912(0.364)
Professional reputation	3.83 (1.041)	4.20 (0.790)	0.194	**-2.037(0.044)**
Scenarios 3 (High Information Asymmetry, High Explicit Knowledge, Low Tacit Knowledge)				
Firm fixed price contract	3.58 (1.072)	3.67 (1.029)	0.633	-0.427(0.672)
Time and materials contracts	3.51 (0.903)	3.02 (1.127)	0.032	**2.414(0.018)**
Purchase orders	3.72 (0.919)	3.22 (1.177)	0.032	**2.350(0.021)**
Incentive contracts	3.58 (0.960)	3.51 (1.175)	0.097	0.355(0.724)
Advisor firm participation	3.51 (0.924)	3.31(0.983)	0.645	1.082(0.282)
Chain of command	3.26 (0.828)	3.14 (0.788)	0.890	-0.902(0.369)
Self control	3.40 (0.876)	3.41 (0.814)	0.628	-0.071(0.943)
Professional reputation	3.47 (0.983)	4.00 (0.645)	0.000	**-3.252(0.002)**
Scenarios 4 (Low Information Asymmetry, High Explicit Knowledge, High Tacit Knowledge)				
Firm fixed price contract	3.53 (1.238)	3.12 (1.189)	0.959	1.713(0.090)
Time and materials contracts	3.60 (1.034)	3.60 (1.125)	0.632	0.018(0.986)
Purchase orders	3.64 (0.913)	2.94 (1.219)	0.031	**3.301(0.001)**
Incentive contracts	3.36 (0.954)	3.20 (1.069)	0.856	0.799(0.426)
Advisor firm participation	3.30 (1.191)	2.76 (1.153)	0.896	**2.354(0.020)**
Chain of command	3.17 (1.004)	3.50 (0.863)	0.391	-1.791(0.076)
Self control	3.36 (1.048)	3.58 (0.702)	0.009	-1.275(0.206)
Professional reputation	3.42 (1.054)	3.58 (0.756)	0.048	-0.921(0.359)
Scenarios 5 (Low Information Asymmetry, Low Explicit Knowledge, High Tacit Knowledge)				
Firm fixed price contract	3.40 (0.958)	3.40 (1.229)	0.034	-0.017(0.986)
Time and materials contracts	3.55 (0.837)	3.44 (0.993)	0.306	0.597(0.552)

Purchase orders	3.47 (0.838)	2.78 (1.148)	0.034	**3.487(0.001)**
Incentive contracts	3.55 (1.038)	3.46 (1.199)	0.139	0.397（0.692）
Advisor firm participation	3.38 (1.169)	3.28 (1.341)	0.076	0.395（0.693）
Chain of command	3.32 (0.906)	3.78 (0.887)	0.511	**-2.608（0.010）**
Self control	3.38 (0.995)	3.62 (1.048)	0.673	-1.211（0.229）
Professional reputation	3.70 (0.903)	4.22 (0.840)	0.477	**-3.046（0.003）**
Scenarios 6 (High Information Asymmetry, High Explicit Knowledge, Low Tacit Knowledge)				
Firm fixed price contract	3.81 (0.779)	3.38 (1.105)	0.001	**2.303（0.024）**
Time and materials contracts	3.87 (0.754)	3.52 (1.054)	0.002	1.936（0.056）
Purchase orders	3.69 (0.886)	2.96 (1.142)	0.148	**3.632（0.000）**
Incentive contracts	3.89 (0.883)	3.96 (1.009)	0.765	-0.383（0.702）
Advisor firm participation	3.07 (1.211)	2.82 (1.224)	0.813	1.064（0.290）
Chain of command	3.30 (1.002)	3.56 (0.837)	0.116	-1.450（0.150）
Self control	3.37 (0.938)	3.44 (0.907)	0.587	-0.384（0.702）
Professional reputation	3.31 (1.025)	3.52 (0.886)	0.373	-1.088（0.279）
Scenarios 7 (Low Information Asymmetry, Low Explicit Knowledge, Low Tacit Knowledge)				
Firm fixed price contract	3.89 (1.022)	3.12 (1.317)	0.001	**3.276（0.001）**
Time and materials contracts	3.76 (1.008)	3.57 (1.041)	0.575	0.930（0.355）
Purchase orders	3.74 (0.894)	3.22 (1.123)	0.057	**2.592（0.011）**
Incentive contracts	3.33 (1.197)	3.24 (1.199)	0.976	0.374（0.709）
Advisor firm participation	3.00 (1.259)	2.67 (1.214)	0.862	1.337（0.184）
Chain of command	3.26 (0.994)	3.35 (1.071)	0.749	-0.431（0.668）
Self control	3.20 (1.053)	3.16 (1.067)	0.956	0.193（0.847）
Professional reputation	3.20 (1.105)	3.16 (1.106)	0.670	0.185（0.853）
Over all scenarios				
Firm fixed price contract	3.560 (1.048)	3.346 (1.178)	0.000	**2.577(0.010)**
Time and materials contracts	3.587 (0.914)	3.280 (1.112)	0.000	**4.042(0.000)**
Purchase orders	3.651 (0.888)	2.916 (1.194)	0.000	**9.334(0.000)**
Incentive contracts	3.539 (0.998)	3.424 (1.136)	0.001	1.443(0.149)

Advisor firm participation	3.405 (1.110)	3.236 (1.236)	0.003	1.931(0.054)
Chain of command	3.275 (0.945)	3.533 (0.871)	0.167	**-3.822(0.000)**
Self control	3.379 (0.983)	3.467 (0.917)	0.124	-1.247(0.213)
Professional reputation	3.468 (1.034)	3.801 (0.898)	0.000	**-4.614(0.000)**

a. For Levene's Test for Equality of Variances, if $p > 0.05$ we used equal variances assumed T-test for equality of means, if $p < 0.05$ we use equal variances not assumed T-test for equality of means.